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(54) Booklet printer page turning means

Seitenwendevorrichtung für einen Buchdrucker

Dispositif pour tourner les pages dans une imprimante pour livret

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Description**BACKGROUND OF THE INVENTION****Field of the Invention**

This invention relates to a booklet printer for use in a terminal device of a bank, a booklet issuing machine used, for example, by a clerk of a bank, or the like, and also relates to a booklet handling apparatus in such a printer.

Description of the Related Art

In a passbook printer mounted on an automated teller machine, a passbook printer used, for example, by a bank clerk, and the like, the machine automatically turns over the pages, and prints characters on a necessary portion of the passbook. Passbooks handled by such a passbook printer are broadly classified into two kinds, that is, a vertical stitch one having a binding portion (at which the pages are fastened together) disposed perpendicular to the direction of printing, and a horizontal stitch one having a binding portion disposed parallel to the direction of printing.

Among the above passbook printers, there is the type which can turn over the pages of either of the two kinds of passbooks.

For example, transfer means for transferring a passbook in its opened condition, as disclosed in Japanese Patent Unexamined Publication No. 63-9564, includes a page turning member which is inclined 45 degrees with respect to the direction of transfer of the passbook transferred by this transfer means. This page turning member is rotated and brought into contact with the page of the passbook so as to raise the page, and then is moved generally in the above 45° direction so as to turn over the page. At this time, a push-up plate, provided on the side of the passbook opposite to the page turning member, slightly bends the page of the passbook into a convex configuration, thereby preventing two pages from being turned over at a time.

In the above prior art, the page turning roller (member) for turning over the pages of the passbook is designed to perform the two motions, that is, the rotational motion and the translational motion in the direction of generally 45 degrees with respect to the direction of transfer of the passbook. Therefore, the mechanism is complicated, and besides no consideration is given to the handling time. Thus, there have been encountered two problems, that is, the increased cost and the slow handling.

Another example of a passbook printer is known from EP 381 137 which is capable of performing the page turning operation irrespectively of whether the passbook inserted into the apparatus is a front-to-rear opening type or a side-to-side opening type. The page turning operation is performed by means of a page turning roller disposed in an obliquely intersecting relation to

a passbook transfer direction and a flat paper guide section disposed substantially perpendicularly to a rotating direction of the page turning roller. This passbook printer has attempted to decrease handling time, however, a problem that is still encountered lies in the reliability of turning over the page struck by the flat paper guide.

SUMMARY OF THE INVENTION

It is an object of this invention to provide a booklet printer which takes a short time for handling a vertical stitch booklet, and is reduced in cost.

Another object of the invention is to provide a booklet handling apparatus for handling a vertical stitch booklet, which is simple and reliable in mechanism.

A booklet handling apparatus according to the present invention comprises a page turning roller disposed obliquely relative to a direction of travel of a booklet, and a guide which is provided near the page turning roller and has a twistingly-curved portion, a flat portion and a projected portion.

A booklet printer according to the present invention comprises the above booklet handling apparatus, and serves to print characters on a required portion of the booklet in accordance with optical information and magnetic information, provided on the booklet, and external electronic information from outside.

In the present invention, for turning pages of the booklet, the hollow page turning roller, disposed obliquely relative to the direction of transfer of the booklet, is rotated, and is contacted with the uppermost page of the booklet to thereby turn over this page. At this time, since this page is restrained by the guide provided in the page turning direction, and transfer rollers, only this page can be turned over in a reliable manner. When this page is turned over, the booklet is transferred, and is caused to strike against the guide provided obliquely relative to the direction of transfer of the booklet. As a result, the page obliquely strikes against this guide, and receives a reaction force. If the angle between the transfer direction and the guide surface is represented by θ , that component of the reaction force serving to turn over the page has a magnitude obtained by multiplying the transfer force by $\sin\theta \cdot \cos\theta$. This force enables the page to be turned over.

BRIEF DESCRIPTION OF THE DRAWINGS

50 Fig. 1 is a plan view of a page turning portion in the present invention;

Fig. 2 is a side-elevational view of the page turning portion of Fig. 1;

Fig. 3 is a perspective view of a passbook used in the present invention;

Fig. 4 is a perspective view of a page turning roller of the page turning portion of Fig. 1;

Figs. 5 to 8 are plan views showing the page turning operation;

Figs. 9 to 13 are side-elevational views showing the page turning operation; and

Fig. 14 is a schematic view showing a passbook printer of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

One preferred embodiment of the present invention will now be described with respect to the drawings.

Fig. 1 is a partly cross-sectional, plan view of a page turning portion (main portion) of a passbook handling apparatus (booklet handling apparatus) of the present invention used in a financial company or the like. Fig. 2 is a side-elevational view of the page turning portion.

A passbook transfer passage comprises a first side frame 1, a second side frame 2, a first guide (paper pan) 4, a second guide (paper guide) 5 and a third guide (paper guide) 6. The paper guide 5 is disposed in obliquely intersecting relation to a direction A of transfer of a passbook. Each of the paper guides 5 and 6 is spaced a predetermined distance from the paper pan 4, and is disposed in opposed relation to the paper pan 4.

A page turning roller 7 is driven by a motor 8. The page turning roller 7 is provided between the paper guides 5 and 6 in opposed relation to the paper pan 4, and is disposed obliquely relative to the passbook transfer direction A.

Transfer rollers 9, 10 and 11 are rotatably provided at the paper guide 6, and are supported by leaf springs 17, 18 and 19, respectively, to be held in contact with a transfer roller 27. Transfer rollers 12, 13, 14 and 15 are rotatably provided at the paper guide 5, and are supported by leaf springs 20, 21, 22 and 23, respectively, to be held in contact with a transfer roller (not shown). A transfer roller 16 is supported by a leaf spring 24 at the paper guide 5, and is rotatable, and is held in contact with a transfer roller 32.

As shown in Fig. 2, the paper guide 5 comprises a parallel portion 5c disposed parallel to the paper pan 4, a twistingly-curved portion 5b defining a twistingly-curved surface, a flat portion 5a generally upstanding in a direction intersecting the paper pan 4, and a projected portion 5d. The paper guide 6 comprises a parallel portion 6b disposed parallel to the paper pan 4, and a non-parallel portion 6a disposed in non-parallel relation to the paper pan 4.

Fig. 3 shows a passbook 41 to be handled. This passbook 41 is commonly referred to as a vertical stitch passbook, and its binding portion 42 is disposed parallel to a transfer direction A during the transfer of the passbook 41. A direction B of turn-over of the pages is perpendicular to the transfer direction A. A direction, along which rows of printed characters 43 are aligned is parallel to the transfer direction A.

Fig. 4 shows a specific example of page turning roller 7 of the invention. The page turning roller 7 comprises a metal base portion 111, and a frictional contact

portion 112. The frictional contact portion 112 comprises a hollow elastic body made of a high-friction material such as chloroprene and natural rubber to enable accommodating a change in the thickness of the passbook by elastic deformation. The shape of the frictional contact portion 112 is defined mainly by a first curved surface portion 114 having a first profile curve, and a second curved surface portion 115 having a second profile curve. The first and second curved surface portions 114 and 115 may be replaced by flat portions, respectively. The metal base portion 111 is made of a sintered alloy of iron having a low coefficient of friction relative to a medium such as paper.

15 Next, the page turning operation for the vertical
stitch passbook 41 will now be described with reference
to Figs. 5 to 13. Figs. 5 to 8 are plan views showing the
page turning operation, and Figs. 9 to 13 are side-eleva-
tional views. First, the passbook 41 is held between the
transfer rollers 11 and 27, and is transferred to enter the
20 page turning section. At this time, in accordance with an
instruction from a sensor 56, the passbook 41 is caused
to stop at a predetermined position in the page turning
portion. In this condition, a page 41a of the passbook 41
to be turned over is kept in a restrained condition by the
25 transfer rollers 11 and 27 and the paper guide 6 (Figs. 5
and 9).

Then, the motor 8 is driven to rotate the page turning roller 7 in a page-turning direction, so that the page 41a is subjected to buckle to perform a large amount of deformation, and is turned or curled (Figs. 6 and 10). Then, when the page turning roller 7 further rotates, the page 41a is further turned. Then, the page turning roller 7, after making about one rotation, stops at a stop position (Fig. 11). The transfer rollers are rotated to move the passbook 41 in an eject direction C. At this time, a reverse side (page) 41b of the page 41a is raised by the flat portion 5a of the paper guide 5, and subsequently is rotated in a twisted manner in the page-turning direction B by the twistingly-curved portion 5b (Figs. 7 and 12). In Fig. 7, dynamically, it is thought that a striking phenomenon develops between the page 41b and the twistingly-curved portion 5b of the paper guide 5. At this striking point X, a moment M tending to turn over the page 41a, a force F_b tending to buckle the page 41a in the direction of the plane thereof, and a moment m acting in a direction perpendicular to the moment M are exerted. The buckling force F_b is influenced by a distance between the above contact point X and the bind-

50 ing portion 42 and also by an angle θ of striking between the twistingly-curved portion 5b of the paper guide 5 and the page 41a. Therefore, the larger the striking angle θ ($0^\circ \leq \theta \leq 90^\circ$) is, the larger the buckling force F_b is. Therefore, the configuration of the twistingly-curved portion 5b of the paper guide 5 should be so determined 55 as to make the striking angle θ as small as possible; however, it is also necessary to make a space, occupied by the apparatus, as small as possible. To meet these requirements, the twistingly-curved portion 5b of the paper guide 5 has such a curved configuration as to

progressively increase the striking angle θ . And besides, in order to shorten the time required for turning over the page 41a, the twistingly-curved portion 5b of the paper guide 5 also has a twisted configuration. Further, since a dislocation angle α develops due to the moment m , the projected portion 5d of the page guide 5 is needed. When this dislocation occurs, a bulge develops in that portion of the passbook 41 near the binding portion 42. When this bulge is restrained and pressed in a crushing manner by the projected portion 5d, the dislocation angle α results in reducing to substantially 0°. The dislocation angle α not only adversely affects the printing precision, but also may cause a jamming during the transfer of the passbook. The projected portion 5d of the paper guide 5 may be replaced by a restraint member which is provided between the twistingly-curved portion 5b of the paper guide 5 and the transfer rollers 12, 13, 14 and 15 in the vicinity of the binding portion 42 of the passbook, in which case the above dislocation angle α can be reduced to substantially 0°.

When the transfer rollers are further rotated to transfer the passbook 41 in the eject direction C, the reverse side (page 41b) of the page 41a of the passbook 41 appears, thus completing the page turning operation (Figs. 9 and 13).

Fig. 14 shows one preferred embodiment of a passbook printer of the present invention. The printer of the present invention basically comprises a transfer passage having an insertion port 58 and a paper pan 4, a transfer system constituted by transfer rollers 11, 15, 16, 61, 63, 65, 62, 64, 66, 59, 32 and 27 driven by a transfer drive motor 51, sensors 56, 54 and 55 for detecting the existence of a passbook 41, a printing section 52, an optical character-detecting sensor 53 for reading information such as bar codes, an optical character-detecting section 45, a magnetic information-detecting sensor 57 (e.g., magnetic head) for reading information such as magnetic stripes, a magnetic information-detecting section 44, a page turning section (which includes a page turning roller 7 driven by a page turning motor 8, and paper guides 5 and 6), an interface 46, a computing section 47, an information operating section 48, a power source section (not shown), and an information input/output control section (not shown) for inputting and outputting information with respect to an external computer or the like.

The passbook 41 is inserted through the insertion port 58, and information, such as bar codes, provided on the passbook 41 is read by the optical character-detecting sensor 53 and the optical character-detecting section 45. Also, information, such as magnetic stripes, provided on the passbook 41 is read by the magnetic information-detecting sensor 57 and the magnetic information-detecting section 44.

The sensors 54, 55 and 56 for detecting the position of the passbook 41 are provided respectively at predetermined positions in the transfer passage. In accordance with signals from the sensors 54, 55 and 56 and signals from the detecting section 44 and 45, the

page of the passbook 41 is turned over by the page turning roller 7, and necessary information is printed on the passbook 41 at the printing section 52.

In this embodiment, although explanation has been made with respect to passbooks, the present invention can, of course, be applied to a booklet having a number of sheets bound together as in the passbook.

As described above, in the present invention, the page turning of the vertical stitch passbook can be carried out in a reliable manner with the simple construction. Therefore, information, requiring a number of pages for printing, can be automatically printed on the passbook.

15 Claims

1. Page turning means for a booklet printer or the like, comprising:

20 - means for the transportation of a booklet in a printer or the like, forming a transport passage with a planar surface and having first (4), second (5) and third (6) guide means for guiding the transportation of said booklet, and
25 - a motor driven page turning roller (7, 8),

wherein said first guide means (4) has a planar surface, and said second guide means (5) is positioned near said page turning roller (7) and comprises a first flat portion (5c) being spaced a predetermined distance from, in opposed relation and parallel to said planar surface of said first guide means (4) so as to allow throughpassage of said booklet,

35 characterized in that
said second guide means (5) has a curved portion (5b) disposed in obliquely intersecting relation to the booklet transport direction (A), its guide surface (5b) forming an angle (θ) with the said booklet transport direction (A) which angle is small in the vicinity of said page turning roller (7) and is progressively increasing in the direction away therefrom; said curved portion (5b) which is curved away from said page turning roller (7) with its surface being twisted, extends in the vicinity of said page turning roller (7) into a second flat portion (5a) which extends in a direction perpendicular transverse to the booklet transport direction (A) and is

40 45 inclined in the booklet transport direction (A) from the vertical so as to overlap said first flat portion (5c).

50 55 2. Page turning means according to claim 1, characterized in that said second (5) and third (6) guide means are spaced from said first guide means (4) with gaps therebetween, that they are spaced from each other and face each other.

3. Page turning means according to claim 2, charac-

terized in that the third guide means (6) is configured to extend in a direction away from a surface of said first guide means (4) at a predetermined angle of inclination relative to a direction perpendicular to the booklet transport direction. 5

4. Page turning means according to claim 2, characterized in that said second guide means (5) comprises a fourth portion (5d) which projects toward said first guide means (4). 10

Patentansprüche

1. Vorrichtung zum Umschlagen von Seiten für einen Broschürendrucker oder ähnliches, der aufweist: 15

- eine Einrichtung zum Transportieren einer Broschüre in einem Drucker oder ähnlichem, die einen Transportdurchgang mit einer ebenen Oberfläche bildet und erste (4), zweite (5) und dritte (6) Führungseinrichtungen zum Führen des Transportes der Broschüre aufweist, und
- eine Walze (7, 8) zum Umschlagen von Seiten, die durch einen Motor angetrieben ist, 20

wobei die erste Führungseinrichtung (4) eine ebene Oberfläche aufweist und wobei die zweite Führungseinrichtung (5) nahe der Walze (7) zum Umschlagen von Seiten positioniert ist und einen ersten flachen Abschnitt (5c) aufweist, der um einen vorbestimmten Abstand in gegenüberliegender Beziehung und parallel zu der ebenen Oberfläche der ersten Führungseinrichtung (4) beabstandet ist, um den Durchgang der Broschüre zu erlauben, 25

dadurch gekennzeichnet, daß die zweite Führungseinrichtung (5) einen gekrümmten Abschnitt (5b) aufweist, der in schräg kreuzender Beziehung zu der Transportrichtung (A) der Broschüre angeordnet ist, wobei ihre Führungsoberfläche (5b) einen Winkel (θ) mit der Transportrichtung (A) der Broschüre bildet, wobei dieser Winkel klein in der Nähe der Walze (7) zum Umschlagen von Seiten ist und sich progressiv in 30

der Richtung weg davon vergrößert; wobei der gekrümmte Abschnitt (5b) der von der Walze (7) zum Umschlagen von Seiten weggekrümmt ist und dessen Oberfläche verdreht ist, sich in der Nähe der Walze (7) zum Umschlagen von Seiten in einen zweiten flachen Abschnitt (5a) erstreckt, der sich in 35

einer Richtung senkrecht transversal zu der Transportrichtung (A) der Broschüre erstreckt und in der Transportrichtung (A) der Broschüre von der Vertikalen geneigt ist, um den ersten flachen Abschnitt (5c) zu überlappen. 40

2. Vorrichtung zum Umschlagen von Seiten gemäß Anspruch 1, dadurch gekennzeichnet, daß die zweiten (5) und dritten (6) Führungseinrichtungen von der ersten Führungseinrichtung (4) mit Spalten dazwischen beabstandet sind, daß sie voneinander beabstandet sind und daß sie eineinander gegenüberliegen. 45

3. Vorrichtung zum Umschlagen von Seiten gemäß Anspruch 2, dadurch gekennzeichnet, daß die dritte Führungseinrichtung (6) so konfiguriert ist, daß sie sich in eine Richtung weg von einer Oberfläche der ersten Führungseinrichtung (4) in einem vorbestimmten Neigungswinkel relativ zu einer senkrechten Richtung zu der Transportrichtung der Broschüre erstreckt. 50

4. Einrichtung zum Umschlagen von Seiten gemäß Anspruch 2, dadurch gekennzeichnet, daß die zweite Führungseinrichtung (5) einen vierten Abschnitt (5d) aufweist, der in Richtung der ersten Führungseinrichtung (4) vorsteht. 55

Revendications

1. Dispositif pour tourner les pages pour une imprimante pour livret ou analogue, comprenant : 25

- des moyens pour le transport d'un livret dans une imprimante ou analogue, formant un passage de transport avec une surface plane et possédant un premier moyen de guidage (4), un second moyen de guidage (5) et un troisième moyen de guidage (6) pour guider ledit livret, lors de son transport, et
- un rouleau (7,8) servant à tourner les pages, entraîné par un moteur, 30

dans lequel ledit premier moyen de guidage (4) possède une surface plane, ledit second moyen de guidage (5) est positionné à proximité dudit rouleau (7) servant à tourner les pages et comprend une première partie plane (5c) qui est située à une distance prédéterminée et en vis-à-vis de ladite surface plane dudit premier moyen de guidage (4), tout en étant parallèle, de manière à permettre le passage dudit livret, 35

caractérisé en ce que ledit second moyen de guidage (5) possède une partie courbe (5b) disposée de manière à recouper obliquement la direction (A) de transport du livret, sa surface de guidage (5b) formant un angle (θ) avec ladite direction (A) de transport du livret, cet angle étant faible au voisinage dudit rouleau (7) servant à tourner les pages et augmentant progressivement dans la direction s'écartant de ce rouleau; ladite partie courbe (5b), qui possède une forme courbe s'écartant dudit rouleau (7) servant à tourner les pages, avec sa surface tordue, se prolonge, au voisinage dudit rouleau (7) servant à tourner les pages, par une seconde partie plane (5a) 40

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qui s'étend dans une direction perpendiculaire, transversalement à la direction (A) de transport du livret et est inclinée par rapport à la verticale, dans la direction (A) de transport du livret de manière à recouvrir ladite première partie plane (5c). 5

2. Dispositif pour tourner les pages selon la revendication 1, caractérisé en ce que ledit second moyen de guidage (5) et ledit troisième moyen de guidage (6) sont espacés dudit premier moyen de guidage (4) en étant séparés par des intervalles de telle sorte qu'ils sont espacés l'un de l'autre et en vis-à-vis l'un de l'autre. 10
3. Dispositif pour tourner les pages selon la revendication 2, caractérisé en ce que le troisième moyen de guidage (6) est agencé de manière à s'étendre dans une direction s'écartant d'une surface dudit premier moyen de guidage (4), sous un angle d'inclinaison prédéterminé par rapport à une direction perpendiculaire à la direction de transport du livret. 15
4. Dispositif pour tourner les pages selon la revendication 2, caractérisé en ce que ledit second moyen de guidage (5) comprend une quatrième partie (5d), qui fait saillie en direction dudit premier moyen de guidage (4). 20 25

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FIG. 1

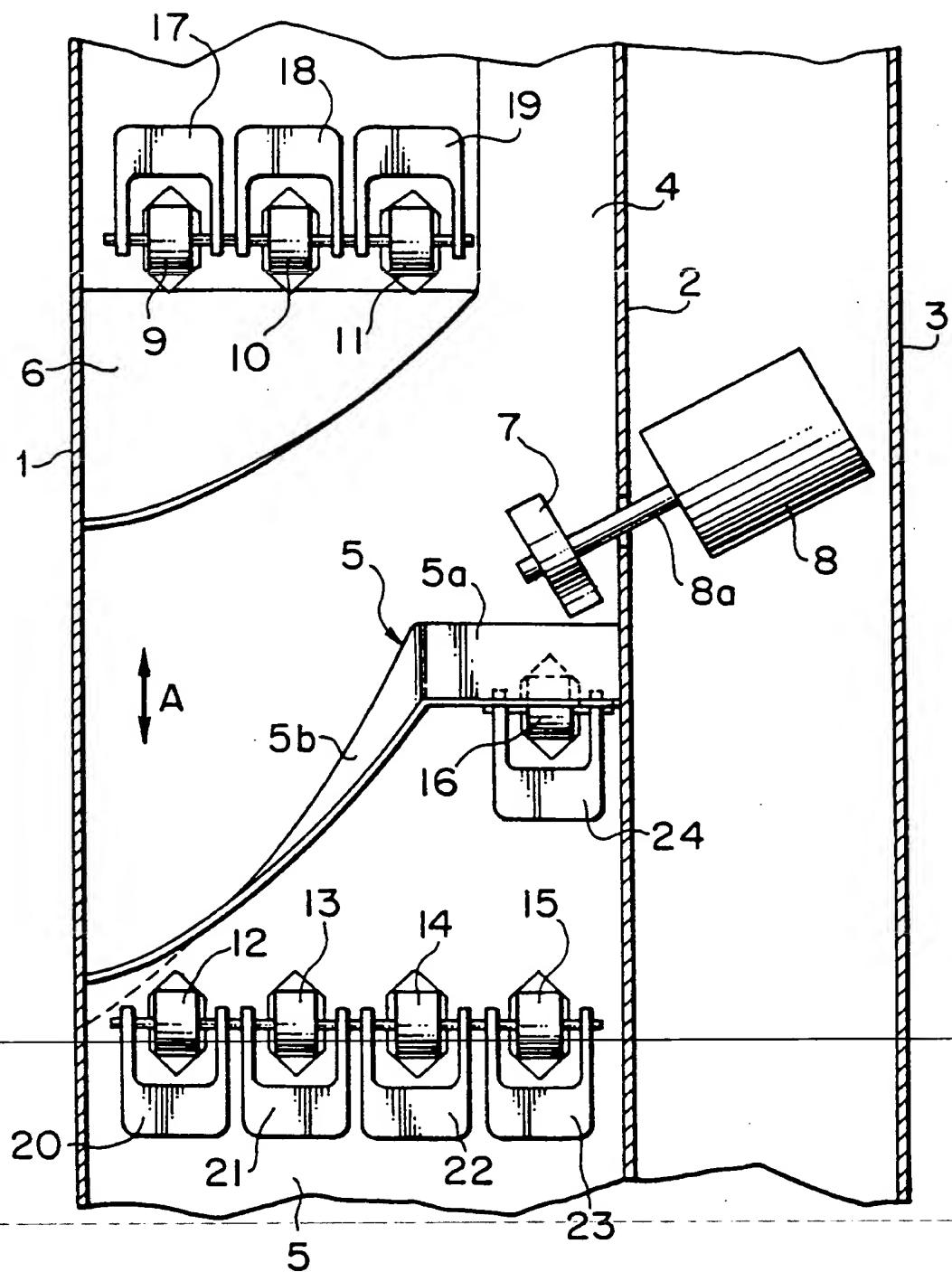


FIG. 2

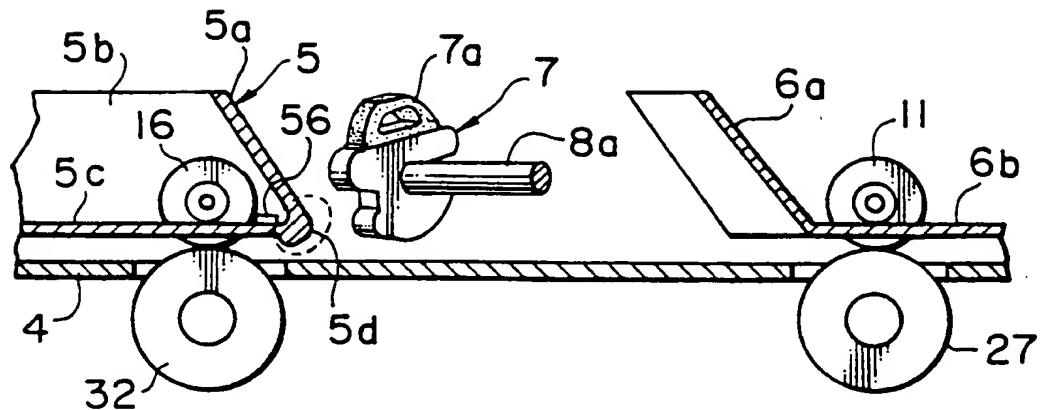


FIG. 3

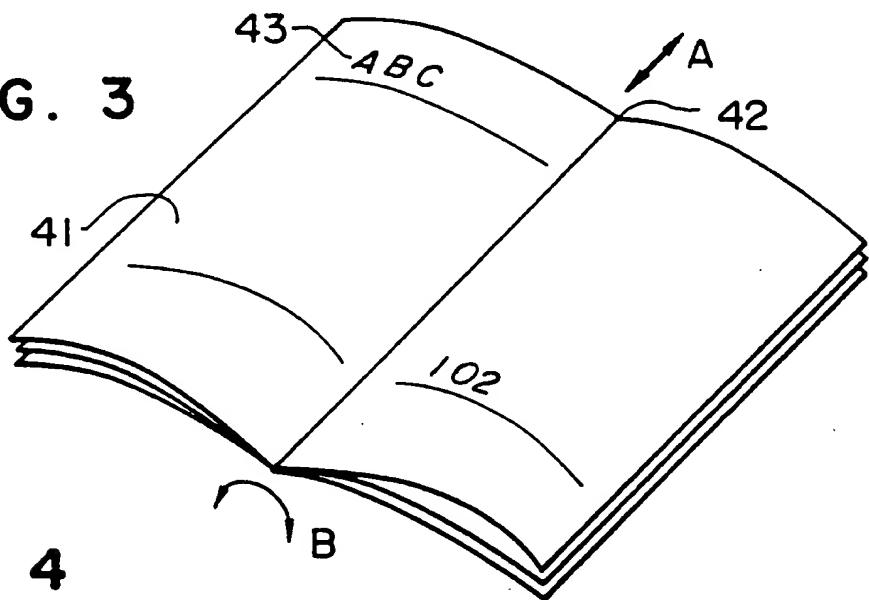


FIG. 4

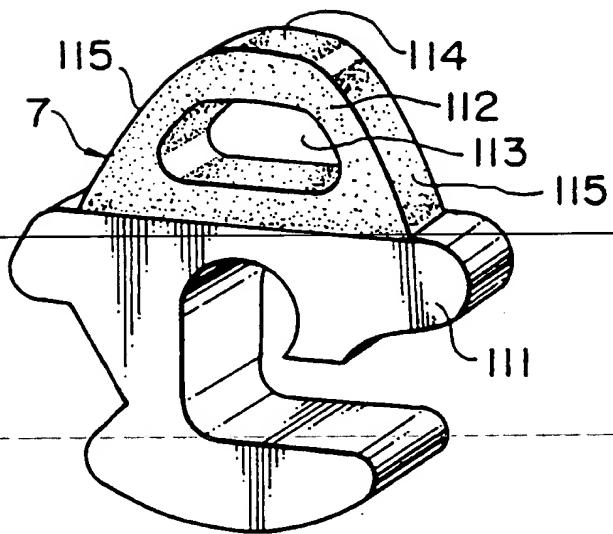


FIG. 5

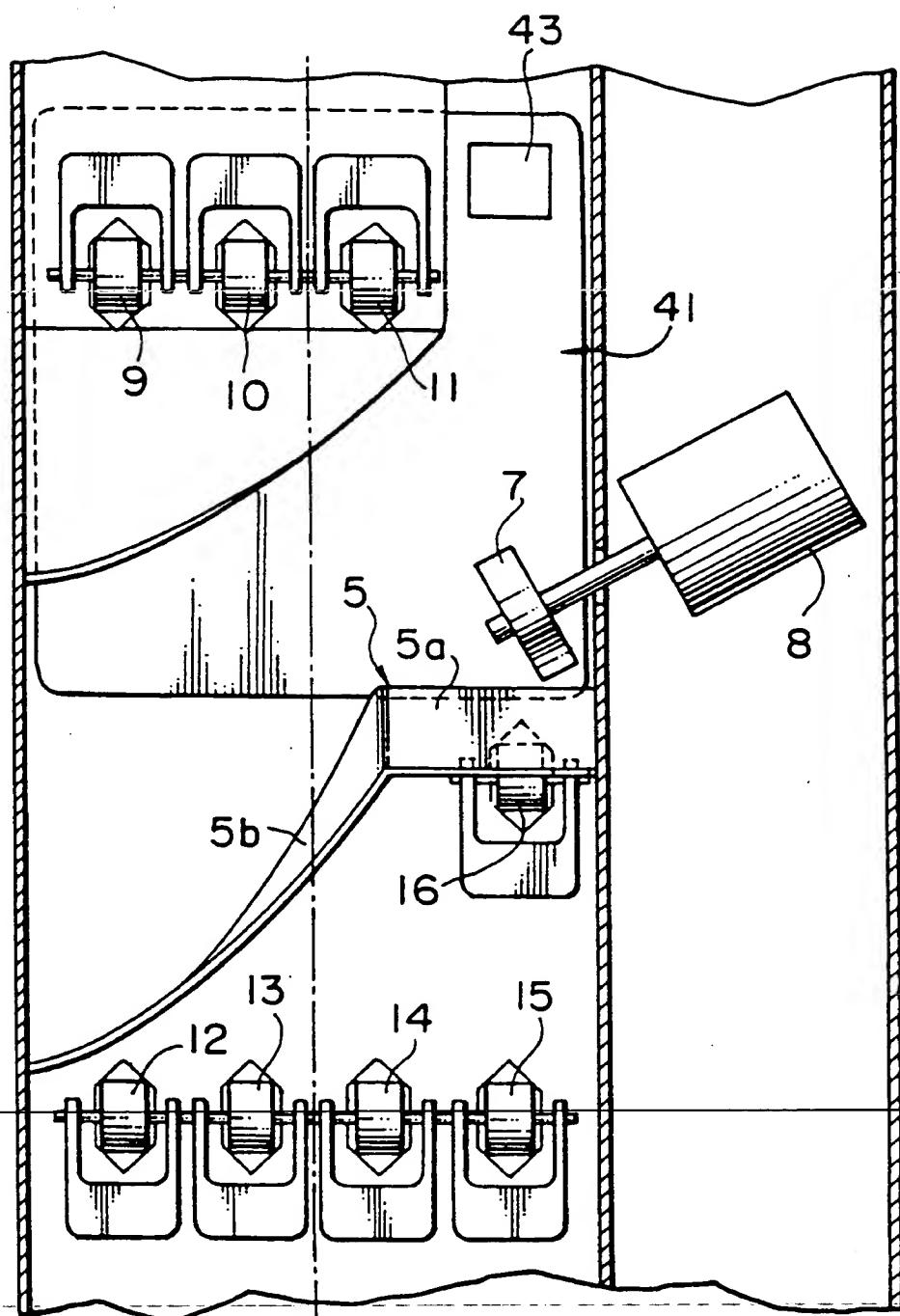


FIG. 6

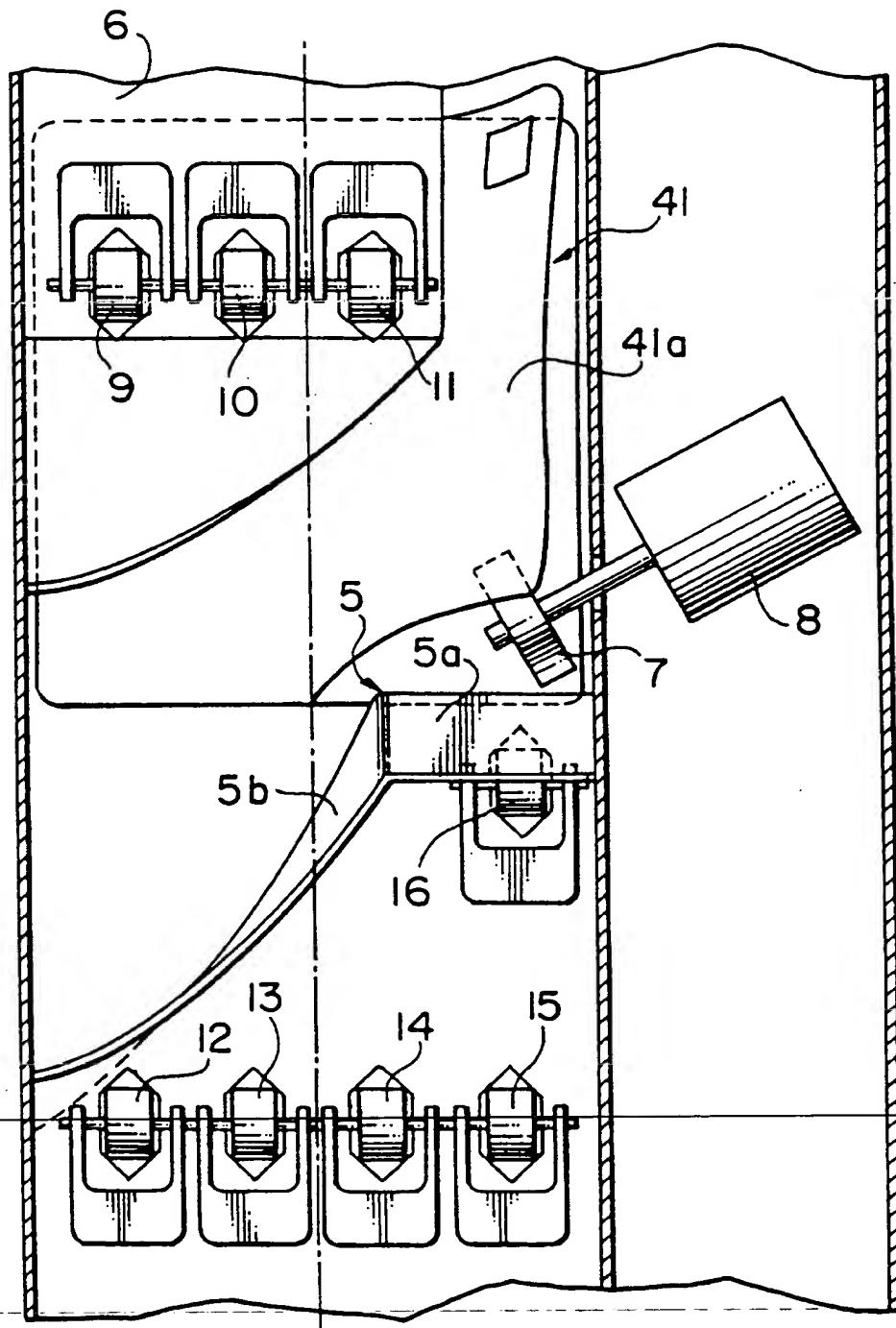


FIG. 7

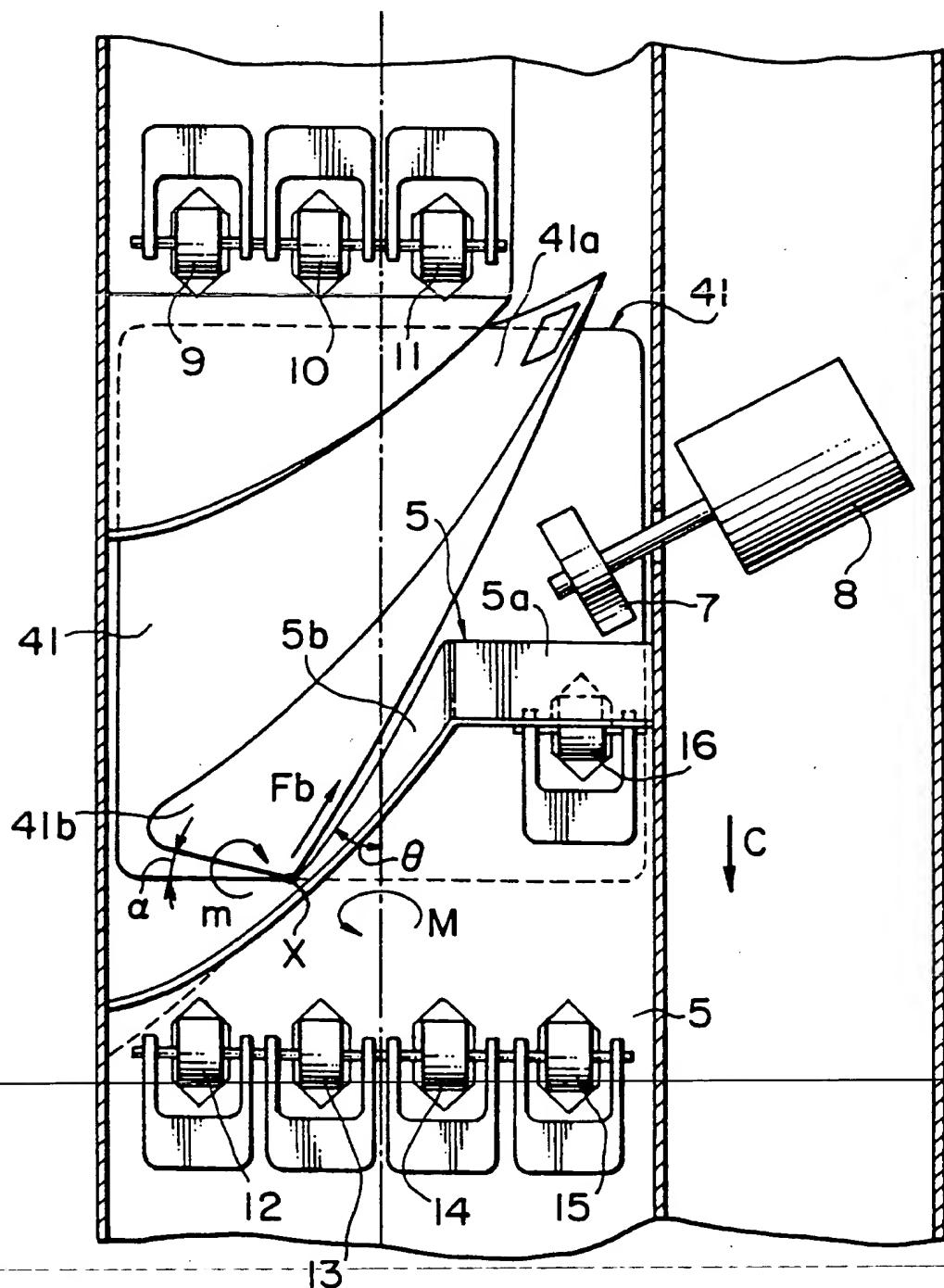


FIG. 8

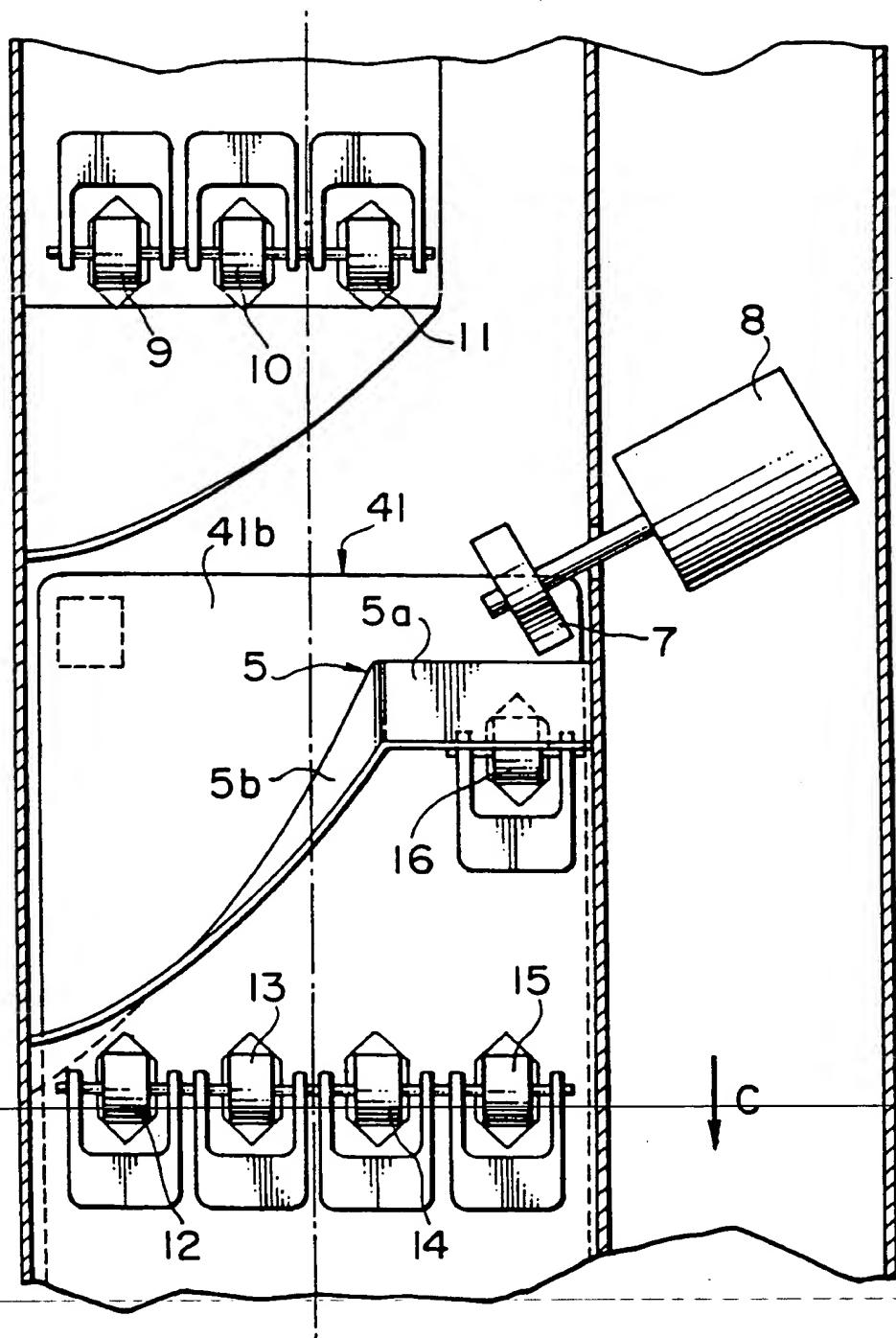


FIG. 9

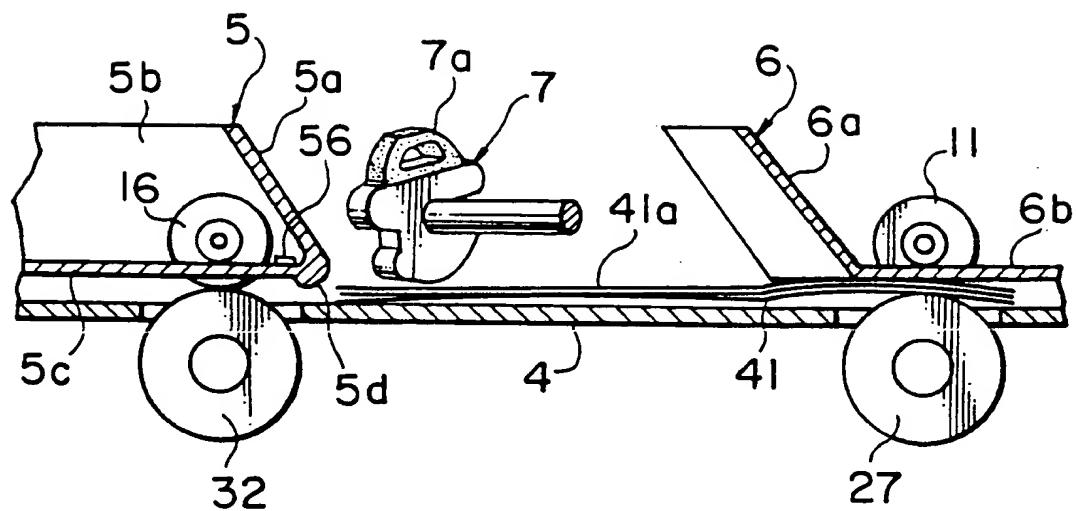


FIG. 10

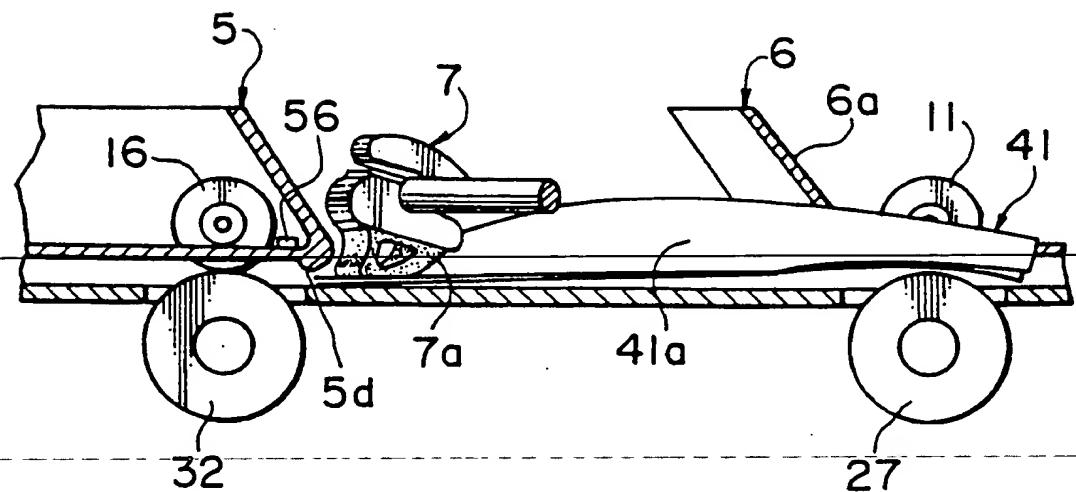


FIG. 11

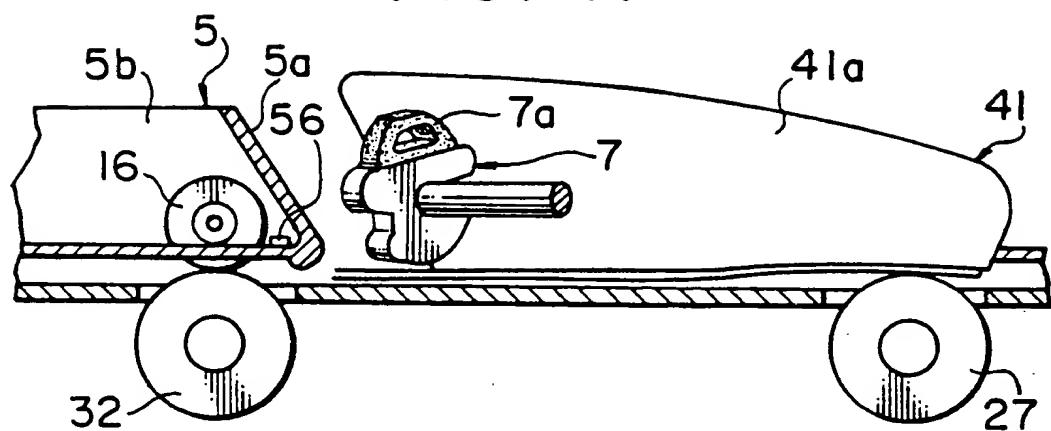


FIG. 12

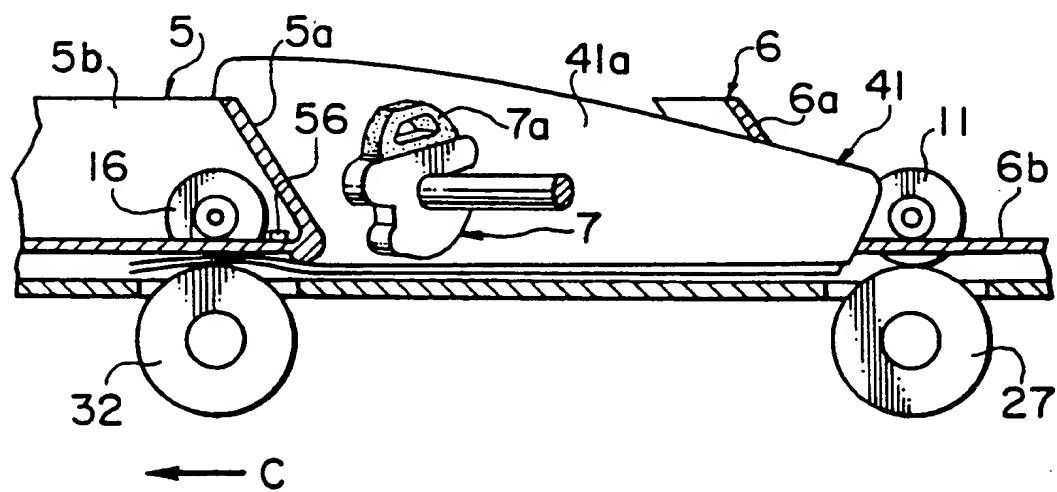
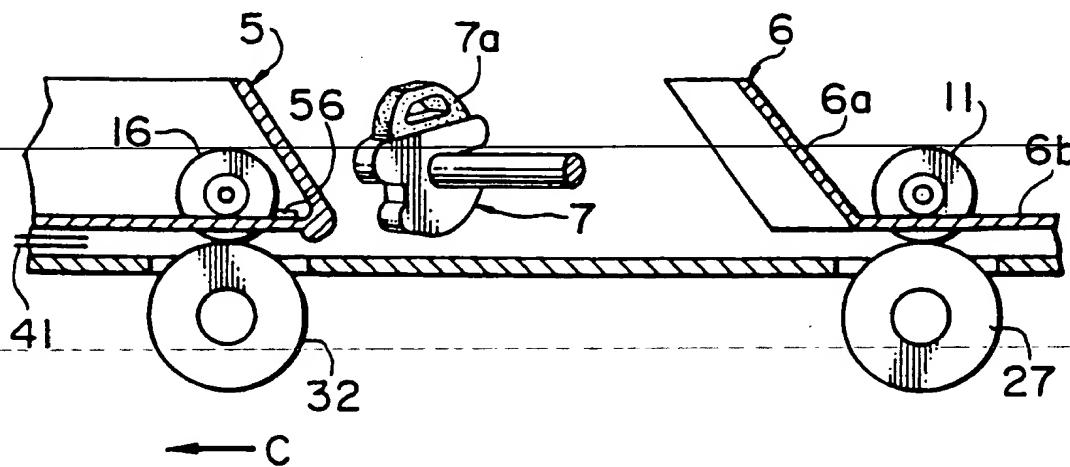


FIG. 13



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